tion, as well as the purity of the air at great heights, especially above the snow-line.

Prof. Tyndall has certainly lost sight of this when he attributes the diathermacy of the air in winter only to the small amount of vapour of water. The same is the case when he points to the relatively small nocturnal radiation on clear nights in many tropical countries. In the case of many of them, besides dust and smoke, the *high relative humidity* has much to do with the small amount of cooling during the night. What quantities of latent heat are liberated by the formation of dew in humid climates of low latitudes, and how much the nocturnal cooling must be impeded by it, everybody can imagine who has been in these countries, or only read scientific travels to them.

A. WOEIKOF

Diurnal Variation in the Velocity of the Wind

THE observations discussed in Mr. Buchan's interesting article on this subject leave little to be desired, and with most of the conclusions meteorologists in general will agree. I am surprised, however, to find such an eminent authority accounting for the large diurnal oscillation on land, solely on the ground of its being due "to the superheating of the surface of the ground, and to the ascensional movement of the air consequent thereon, which tend to reduce the effects of friction and viscosity of the air."

There may perhaps be more hidden within this sentence than appears from the wording of it; but, taking it as it stands, it certainly omits what I believe to be the most important factor in the whole result, viz., *the interchange of motion between the upper and lower layers of the atmosphere, occasioned* by the ascensional movements during the day over superheated land. This has been most clearly shown by Dr. Köppen in an article in the Austrian *Zeitschrift für Meteorologie*,[1] by successive rejection of inefficient causes, to be the only means by which such increase of velocity could be occasioned near the earth's surface.

It is not clear, moreover, how the ascension currents could otherwise diminish the friction of the air enough to account for such a large diurnal increase of velocity. The effect of the increased temperature alone, would certainly be to increase the friction, but as Köppen shows from Meyer's formula for the coefficient of gaseous friction, the daily range of temperature would only cause the friction of the air to vary from ½ to 1 per cent. of its whole amount,[2] so that this factor is evidently without any appreciable influence on the diurnal period.

In the paper already referred to, Dr. Köppen has gone into the whole question most minutely, and a perusal of it will, I think, convince most persons, that the chief factor in causing the diurnal increase of wind-velocity over land is the intermixture of air (*luft-austausch*) resulting from the uprise of heated air from the surface, and the consequent downfall of cooled air to it, "bringing down with it," as Espy told the British Association in 1840, "the motion which it has above, and which is known to be greater than that which the air has in contact with the asperities of the earth's surface."

Among the facts cited by Köppen in favour of his theory may be noted the following:—

1. The fact that in Europe the ratio of the velocity of the wind to the gradient, is greater for N.E. winds and in summer than for S.W. winds and in winter; together with the circumstance that the temperature decrement, and therefore also the facility with which local ascension and descension currents may be formed, is greater under the former conditions than under the latter.

2. That simultaneously with the diurnal increase in the velocity of the lower layers of the atmosphere, those above appear to be retarded.

3. That on stations near the earth's surface the curve of absolute humidity reaches its minimum about the time of maximum wind-velocity, while at elevated stations, such as the Faulhorn, the humidity reaches its maximum at the same time.

In fact it may be concluded, as Köppen graphically puts it, "that the greater the difference of the temperature of the air in a vertical direction, the smaller are the differences in the humidity, barometric pressure, and motion of the air, and that in the early hours of the afternoon the inhabitants of plains are placed to a certain extent on a higher, and the dwellers of Alpine heights on a lower, level, relatively to these elements."

E. DOUGLAS ARCHIBALD

[1] "Die tagliche periode der Geschwindigkeit und Richtung des Windes," September heft, 1879.

[2] Meyer's formula in English measure is $\eta = \eta_0 (1 + \cdot 0014t)$, where η η_0 are the friction coefficients at $t°$ and 32° Fahr. respectively.

The Large Meteor of March 2, 1883

THE meteor described by Mr. R. W. S. Griffith in the last number of NATURE was also observed at Bristol and Bath. At the latter place it was seen by Mr. J. L. Stothert at 9h. 33m. 40s., passing in the direction from α Hydræ to η Canis Majoris. The brilliancy of the meteor was equal to twice that of Venus; colour yellow; motion slow; no train. Comparing this observation with that obtained by Mr. Griffith, it would seem that the meteor probably belonged to a radiant point near Lyra, rising in the north-north-east at the time of its appearance. A meteor shower was observed by the writer on March 14, 1877, between 14h. 12m. and 15h. 43m. from the point α 277°, δ 25°+, the members of which were somewhat slow and devoid of streaks or trains, and the fireball of March 2 last appears to have belonged to the same stream.

It would be important to hear of additional observations of this meteor. Its considerable brightness, and the fact that it appeared at a time when it must have been widely observed, lead me to hope that many other records of its path have been preserved. In all such cases it is very desirable to give the R.A. and Dec. + or − of the beginning- and end-points of the observed path. Descriptions by the stars or compass-bearings are likely to be less accurate, and are often difficult to reduce.

In the *Observatory* for September, 1879, p. 129, I mentioned that "during the first four days of March fireballs have been very numerous, especially on the 1st, 2nd, and 4th." This meteoric epoch is therefore well confirmed by the fireball of the 2nd inst. which it is hoped will aid us in determining one of the chief radiant points of the date.

W. F. DENNING

Bristol, March 12

A VERY brilliant meteor was seen here on March 2 at 9.35 p.m. It burst forth in the immediate neighbourhood of Sirius, and passed downwards to the west at about an angle of 40° from the perpendicular, disappearing after a course of about 25°. Its light was so strong as to make the distant trees, fields, and hedges perfectly visible, brighter than the brightest moonlight. Its colours also were very decided, changing quickly, much as does Sirius to the naked eye, but showing more of the violet at first, and afterwards more of the red.

J. L. J.

Capel, Surrey

On the Movements of Air in Fissures and the Barometer

I SHOULD be glad to add to my article "On the Movements of Air in Fissures and the Barometer" (NATURE, vol. xxvii. p. 375) a reference to an instrument devised by Mr. Whitehouse, and described in 1871 before the Royal Society (*Proc. Roy. Soc.* vol. xix. p. 491). The apparatus, which was intended to record minute variations of atmospheric pressure, consisted of two hydraulic chambers, connected by a tube or siphon, and buried in the ground. One of the chambers was left open at the top and exposed to atmospheric pressure, the other was closed and removed from such pressure; the difference in the level of the water in the two was a measure of the variation in the atmospheric pressure. This instrument reproduces those conditions to which the oscillation of the water-level in certain chalk-wells, coincident with the barometic changes, has been attributed. It was believed by the inventor that by its aid he had been able to detect atmospheric waves or pulsations at a distance from a storm-centre; it has not however come into scientific use.

I may further add to my brief allusion to colliery explosions a reference to the paper by R. H. Scott, M.A., F.R.S., and W. Galloway, Mining Engineer, entitled "On the Connection between Explosions in Collieries and Weather" (*Proc. Roy. Soc.* vol. xx. p. 292, 1872).

A. STRAHAN

28, Jermyn Street, March 10

THE PITT-RIVERS COLLECTION

IT will be remembered that some time past Major-General Pitt-Rivers, F.R.S., most munificently offered his far-famed Anthropological Collection to the University of Oxford on the condition that the University should erect a building adequate to contain it and display it properly. On Wednesday, the 7th ult., a vote was passed by Convocation authorising the Curators of the Univerity

Chest to expend a sum of 7500*l.* on the erection of an annex to the east side of the present University Museum to contain the collection and to provide the requisite cases and fittings; a vote of thanks to General Pitt-Rivers was also passed.

This most important collection, therefore, which commenced its public existence at Bethnal Green, and has so long been exhibited at South Kensington, will rest finally at Oxford, where it cannot fail to be studied with ever increasing interest and benefit to learning generally. The title of the collection as the "Pitt-Rivers Collection" is to be maintained, and the developmental and gradational system of arrangement devised by the donor, and carried out by him in the greater part of the collection, with such valuable and interesting results is to be retained. The new building, which will be provided with two galleries, will be entered by two doorways at different levels from the present University Museum.

The delegates of the Museum have elected Dr. E. B. Tylor to be Keeper of the Museum in place of the late Prof. Henry Smith, so that the new collection, as well as the anthropological collection of the late Prof. Rolleston, will fall into the hands of the man most suited to arrange and explain them.

JOHN RICHARD GREEN

THE death of Mr. Green, at the early age of forty-five years, we regard as a serious loss not only to historical literature but to science. We have frequently maintained that science has no peculiar sphere, that every field of human research is capable of scientific treatment. As we pointed out in reviewing Mr. Green's famous "Short History" and his "Making of England," he has the credit of having been the first historian who appreciated the function of science in a State, or the moulding power of the environment of a people. Not only so, but he distinctly aimed at showing that the history of a people is simply an evolution dependent for its course and outcome on the action and reaction between the entity and its surroundings. This conception of the function of the historian was probably even more distinctly brought out in the "Geography of the British Isles," by Mr. Green and his accomplished and congenial wife. As we pointed out in our notice of the "Short History" moreover, Mr. Green not only wrote his "History" on a scientific method, but gave large space in that history to a record of the progress of science and of scientific societies, as distinct and influential elements in the life of our nation. Indeed he may be regarded as the first historian who, breaking away from the old conventional methods of writing history from the outside, and thus mistaking the shell for the kernel, adopted the method of the physical geographer as distinct from the mere topographer, and, penetrating deep beneath the surface, traced the forces which have actuated the nation and brought it to its present standpoint. Although the impulse given by Mr. Green to historical study will certainly bear fruit, his loss cannot be overestimated. His "Making of England" was evidently only a prelude to a series of volumes in which he intended to show in minute detail the interaction between the various elements that go to make up the life of these islands,—the ethnical and moral elements on the one hand, and the encompassing physical elements on the other. Happily he has left behind him in a nearly complete state a second volume on "The Coming of the Northmen," which brings his scheme down to the point when it may be said that all the forces were in the field, the continued action of which has gone to make up the England of to-day. Since Mr. Green's death ample testimony has been borne to his rigidly scientific method of work, and the patience with which he wrote and rewrote ere his own severely critical standard was reached. It will be difficult to find a successor to Mr. Green so far as stirring eloquence of style is concerned, but we trust that his scientific method may find favour, and that historians in future will endeavour to trace the life of a nation as he did, after the manner of the biologist and physical geographer.

THE BOTANY OF THE "CHALLENGER" EXPEDITION

FROM time to time various contributions to the Botany of the *Challenger* Expedition have been published in the *Journal* of the Linnean Society, chiefly in the fourteenth and fifteenth volumes; but hitherto no part of the botanical results has appeared in the series of sumptuous volumes in which are recorded the discoveries and observations of the expedition. The Government have at length decided to devote one volume of about 350 pages and fifty plates to the elucidation of the flora of the more interesting countries visited, which the writer of the present article has undertaken with the assistance and under the superintendence of Sir Joseph D. Hooker. There can be no doubt that the Government are right in their estimate of the relatively small importance of the results obtained in botany as compared with those obtained in other branches of science; yet we think we shall be able to show that the botanical collections are sufficient to form the basis of a most interesting volume. It is almost superfluous to state that the botanist of such an expedition has little chance of exhausting the flora of any of the numerous countries or regions visited; and the task of elaborating the materials seemed at first an unpromising one. At many of the places visited, and especially some of the more interesting ones, the stay was too short and the means inadequate for making and drying large collections of plants. Nevertheless the naturalist, Mr. H. N. Moseley, seems to have lost no opportunity, having collected in almost every place touched at. Unfortunately the plants of the least-known countries, such as the Aru and Admiralty Islands, reached England in a very much damaged condition. But imperfect as they are, they include a large proportion of novelties, and indicate a flora rich in endemic species. The best collections, so far as number and quality of the specimens are concerned, are those from Chili, Juan Fernandez, Japan, the Sandwich Islands, &c.; yet they contain little or nothing new to science, and by no means fully represent the vegetation of the several countries. There remain the collections made in the remote islets of the Atlantic and Southern Oceans, which, with what was previously known, afford material for a practically complete flora of these isolated spots, so interesting to the student of the distribution of plants and animals. And it has been decided that this shall be the scope of the work.

The Bermudas, the oldest English colony, come first in the arrangement adopted. These islands, having an area of about one-seventh of that of the Isle of Wight, are situated about six hundred miles from the American continent, and although settled as long ago as 1612, nothing approaching a complete and critical account of their vegetation has hitherto been published. The flora is a poor one, especially in regard to number of species, and is evidently of comparatively recent origin, being in this respect in striking contrast to that of various other Atlantic islands—that of St. Helena, for example. The indigenous element has been, almost without exception, derived from the West Indies and the extreme south-east of the mainland of North America. By the indigenous element we mean those species which have reached the islands independently of human agency, direct or indirect. With unimportant, though rather numerous, exceptions, the indigenous and introduced elements are easily dis-